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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KERR, KATHLEEN M

ART UNIT PAPER NUMBER

1652

DATE MAILED: 12/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/804,060	MOCKEL ET AL.
Examiner	Art Unit
Kathleen M Kerr	1652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 8, 9, 21 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 and 9 is/are allowed.
- 6) ☒ Claim(s) 21 and 24-28 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
- 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Application Status

1. In response to the previous Office action, a non-Final rejection (mailed on May 27, 2003), Applicants filed an amendment and response received on September 29, 2003. Said amendment cancelled Claims 2-7, 10-20, and 22-23, amended Claims 1, 8, 9, and 21 and added new Claims 24-28. Claims 1, 8, 9, 21, and 24-28 are pending in the instant Office action and will be examined herein.

Priority

2. As previously noted, the instant application is granted the benefit of priority for the foreign application 100 42 740.5 filed in Germany on August 31, 2000 and for the foreign application 101 08 463.3 filed in Germany on February 22, 2001. A certified foreign translation of 100 42 740.5 was filed on May 14, 2003; said document discloses the claimed invention.

Drawings

3. As previously noted, the drawings have been approved by the Draftsmen and are, therefore, entered as formal drawings acceptable for publication upon the identification of allowable subject matter.

Withdrawn - Objections to the Specification

4. Previous objection to the specification for lacking consistency concerning SEQ ID NO:3 is withdrawn by virtue of Applicants' amendment to the specification.

Withdrawn - Claim Objections

5. Previous objection to Claim 5 under 37 C.F.R. § 1.75 as being a substantial duplicate of Claim 4 is withdrawn by virtue of Applicant's cancellation of said claim.
6. Previous objection to Claim 22 under 37 C.F.R. § 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim is withdrawn by virtue of Applicants' cancellation of said claim.

Withdrawn - Claim Rejections - 35 U.S.C. § 112, second paragraph

7. Previous rejection of Claims 8-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for the length of SEQ ID NO:3 is withdrawn by virtue of Applicant's amendment.
8. Claim 21 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if the fragment limitation related to only SEQ ID NO:1 or also to its complement. Clarification is required.

Withdrawn - Claim Rejections - 35 U.S.C. § 112, first paragraph

9. Previous rejection of Claims 1-3 under 35 U.S.C. § 112, first paragraph, written description, is withdrawn by virtue of Applicant's amendment to Claim 1 and cancellation of Claims 2-3.
10. Previous rejection of Claim 8 under 35 U.S.C. § 112, first paragraph, enabling deposit, is withdrawn by virtue of Applicant's amendment to the specification.

Withdrawn - Claim Rejections - 35 U.S.C. § 102

11. Previous rejection of Claims 1-5, 7, and 20-23 under 35 U.S.C. § 102(e) as being anticipated by Nakagawa *et al.* (USPAP 2002/0197605) is withdrawn by virtue of Applicants' filing a certified translation of a priority document (100 42 740.5 filed in Germany on August 31, 2000). This foreign priority document discloses the claimed invention and its filing pre-dates the filing date of the USPAP 2002/0197605 (December 18, 2000).

NEW ISSUES

Claim Objections

12. Claim 1 is objected to for having improper form of a Markush group. The list requires an ---and--- between items b and c. Correction is required.

Claim Rejections - 35 U.S.C. § 112

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claim 21 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 3, "the fragment of at least 30 consecutive nucleotides" (emphasis added) is unclear since no particular fragment is indicated. The Examiner suggests ---a fragment of at least 30 ... --- for clarity. Correction is required.

14. Claims 24-28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention. The phrase “sensor kinase activity” is unclear. In the specification on pages 1 and 7, the *citA* gene is described as encoding a sensor kinase protein that is a part of a two-component system; no other description is found, including how this functional assignment was made. It is unclear what the protein is “sensing” and what is the substrate for the “kinase” activity.

In the art, the Examiner finds description of “*Klebsiella pneumoniae* citrate fermentation regulatory genes: sensor kinase CitA” (GenBank Accession Number U31464); in the “Features” section of this GenBank entry is “sensor kinase of a two-component regulatory system”. It is unclear if this is the “sensor kinase” activity indicated, particularly since no homology was found between the *C. glutamicum* *citA* disclosed in the instant application and the *K. pneumoniae* *citA* taught in the art. Clarification is required.

15. Claims 25-28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is confusing how hybridizing to the complement of Claim 1, item c (complement itself), would encode a protein, let alone a sensor kinase protein. Clarification is required.

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

16. Claims 24-28 are rejected under 35 U.S.C. § 112, first paragraph, written description, as containing subject matter which was not described in the specification in such a way as to

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reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 24 and 25 are drawn to polynucleotides of a particular structure as defined by % identity or hybridization conditions but having an unclear function, see rejection under 35 U.S.C. § 112, second paragraph above.

The Court of Appeals for the Federal Circuit has recently held that a “written description of an invention involving a chemical genus, like a description of a chemical species, ‘requires a precise definition, such as be structure, formula [or] chemical name,’ of the claimed subject matter sufficient to distinguish it from other materials.” *University of California v. Eli Lilly and Co.*, 1997 U.S. App. LEXIS 18221, at *23, quoting *Fiers v. Revel*, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) (bracketed material in original). To fully describe a genus of genetic material, which is a chemical compound, applicants must (1) fully describe at least one species of the claimed genus sufficient to represent said genus whereby a skilled artisan, in view of the prior art, could predict the structure of other species encompassed by the claimed genus and (2) identify the common characteristics of the claimed molecules, e.g., structure, physical and/or chemical characteristics, functional characteristics when coupled with a known or disclosed correlation between function and structure, or a combination of these.

The instant specification discloses polynucleotides related to SEQ ID NO:1 and related to polynucleotides encoding SEQ ID NO:2. Applicants have fully described the genus relating to said SEQ ID NOs. However, without a clear function, the scope of the related structure is unbounded. Applicants have not fully described a genus that has sequence identity limitations in the absence of clear functional limitations so that one of skill in the art would be able to predict

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the other members of the claimed genus. With the clarification of the term "sensor kinase activity", as noted above, the instant rejection would be withdrawn.

17. Claims 24-28 are rejected under 35 U.S.C. § 112, first paragraph, scope of enablement, because the specification, while being enabling for SEQ ID NO:1 and a polynucleotide encoding SEQ ID NO:2, does not reasonably provide enablement for polynucleotides structurally similar and functionally the same. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The instant rejection is set forth as if Applicants have clarified the activity of a "sensor kinase" as being related to the *K. pneumoniae* sequence noted by the Examiner above since this interpretation seems to be the most reasonable. To make polynucleotides structurally similar to SEQ ID NO:1 that encode sensor kinase polypeptides other than SEQ ID NO:2 would require undue experimentation.

The factors to be considered in determining whether undue experimentation is required are summarized in *re Wands* 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir, 1988). The Court in *Wands* states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.'" (*Wands*, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (*Wands*, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of

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experimentation necessary, (2) the amount or direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

The instant specification teaches SEQ ID NO:2, a sensor kinase protein from *C. glutamicum*, and SEQ ID NO:1, a *C. glutamicum* gene exactly encoding SEQ ID NO:2. The art includes few examples of citA (citrate fermentation protein) encoding genes, with citA being mostly studied in *K. pneumoniae*. The art fully enables any DNA encoding SEQ ID NO:2 based on the degeneracy of the genetic code. While the instant specification may describe and enable means for identifying other citA genes using hybridization methods, etc., these methods do not enable one of skill in the art to make all, or a relevant portion of, the polynucleotides within the scope of the claims because the ability to find a citA gene, which is structurally related to SEQ ID NO:1, is not equivalent to the ability to make a citA gene as required by the statute (i.e., "make and use").

No description in the specification or the art provides particular residues whose encoding is important within the disclosed sequence so that its citA-nature is maintained. In fact, it is unclear from the specification if SEQ ID NO:2 is a sensor kinase like citA from *K. pneumoniae*. Extensive work by Gerharz *et al.* (Biochemistry (2003) 42: 5917-5924) and Reinelt *et al.* (J. Biol. Chem. (2003) 278(40): 39189-39196) with citA genes from various sources have identified basic structures in citA, none of which appear to be maintained in SEQ ID NO:2. While it is unclear if SEQ ID NO:2 is actually a citrate fermentation sensor kinase protein, the

fact remains that its attenuation in *C. glutamicum* leads to increased amino acid production – thus, how to use the disclosed protein (and its encoding DNA) in a useful manner is clearly taught and the claims are enabled for DNA encoding exactly SEQ ID NO:2. However, one of skill in the art would be unable to predict the structure of the other members of the genus of Claims 24 and 25 in order to make such members with sensor kinase activity within the structural limitations claimed. Therefore, the instant claims are not enabled to the full extent of their scope.

Summary of Pending Issues

18. The following is a summary of the issues pending in the instant application:

- a) Claim 1 stands objected to for having improper form of a Markush group.
- b) Claim 21 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for in line 3, “**the** fragment of at least 30 consecutive nucleotides” (emphasis added).
- c) Claims 24-28 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the phrase “sensor kinase activity”.
- d) Claims 25-28 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for how hybridizing to the complement of Claim 1, item c (complement itself), would encode a protein.
- e) Claims 24-28 stand rejected under 35 U.S.C. § 112, first paragraph, written description.
- f) Claims 24-28 stand rejected under 35 U.S.C. § 112, first paragraph, scope of enablement.

Allowable Subject Matter

19. As noted below, Claims 8-9, drawn to a particular vector or a particular internal fragment of SEQ ID NO:1 (SEQ ID NO:3), are allowed. The prior art does not teach SEQ ID NO:1 in its entirety or the particular fragment noted. Thus, moreover, Claims 1 and 21 are drawn to allowable subject matter as well and would be allowed with minor changes as noted in the instant

Office action. Claims 26-28 would also be allowable if they depended ultimately only from Claim 1.

Claims 24-25 have a particular issue pending with enablement based on the evidence presented herein that SEQ ID NO:2 is not a sensor kinase protein and that varying the structure of SEQ ID NO:2 while retaining the sensor kinase function described is not enabled as well.

Conclusion

20. Claims 8-9 are allowed. Claim 1 is objected to. And Claims 21 and 24-28 are rejected herein. The instant Office action is **NON-FINAL** based on new grounds of rejection presented herein, particularly the written description/enablement rejections concerning whether or not SEQ ID NO:1 encodes a sensor kinase protein.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen M Kerr whose telephone number is (703) 305-1229. The examiner can normally be reached on Monday through Friday, from 9:00am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathupura Achutamurthy can be reached on (703) 308-3804. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.



Kathleen M Kerr
Examiner
Art Unit 1652

December 22, 2003